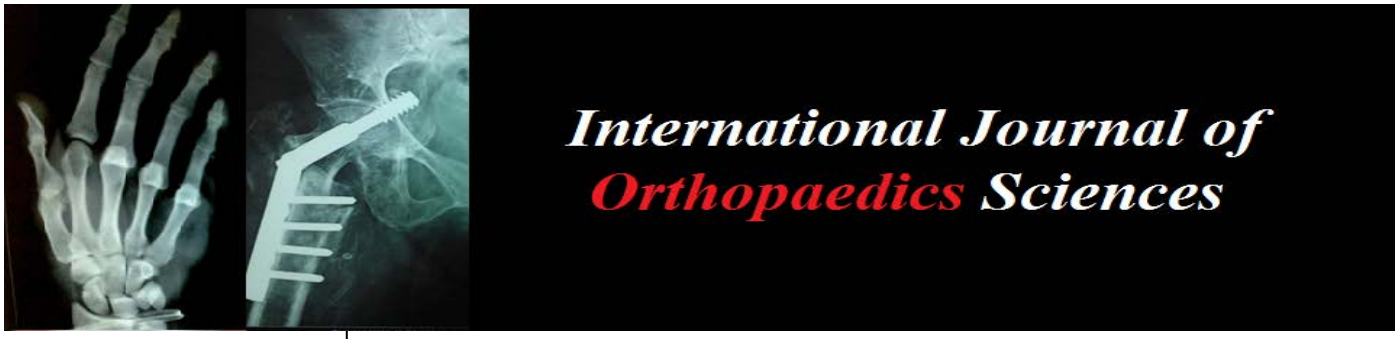

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Functional outcome of chronic low back ache due to a prolapsed inter-vertebral disc treated with caudal epidural steroid injection – a prospective study

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Abstract
Background: Chronic Low back pain has become a very common entity in Indian population and a prolapsed inter-vertebral disc [PIVD] is one of the most leading causes. The aim of the study is to treat chronic low back ache due to a Lumbar PIVD with a Caudal Epidural steroid injection.
Methodology: This is a prospective study conducted at Department of Orthopaedics, MVJ Medical College and research hospital from July 2018 to July 2019. Patients in the age group of 30-60 years with low back ache with or without radicular pain in lower limbs, not responding to oral medications and physiotherapy were included in the study. Caudal epidural block consisting of 80mg of Methyl Prednisolone, 1.5ml of bupivacaine 0.5%, 6.5ml of Distilled water is taken in a 10ml Syringe and given with 22G Spinal needle through sacral hiatus. Patients were evaluated prior to steroid infiltration and follow up at three weeks, three months and six months using the Numeric Pain Rating Scale (NPRS) and Disability using Oswestry Disability Index (ODI).
Results: The total the 60 patients in our study, 2 patients were lost in follow up. Of the remaining 58 patients who were followed for a period of 6 months, 45 patients [78%] had significant relief of pain and improvement in their ODI functional outcome.
Conclusion: Caudal epidural steroid injection is an effective modality of management in patients with chronic low back ache due to a Lumbar PIVD.

Keywords: Low back ache, Caudal epidural steroid injection, Pain relief, Prolapsed inter-vertebral disc

Introduction
Low back ache as a clinical phenomenon is as old as Domenico Cotugno's article "DeIschiade Nervosa Commentarius" in 1764 [1]. The prevalence of low back ache in Indian population due to PIVD is as high as 92 % which is due to multiple physical and socioeconomic causes. Degenerative changes in a prolapsed inter-vertebral disc commonly present as: decreased disc height, osteophytes and sclerosis of upper and lower endplates, narrowing of facet joint, spinal canal stenosis, narrowing of lateral recess, diffuse bulging of the annulus beyond the disc space, extensive fissuring (i.e, numerous annular tears), mucinous degeneration of the annulus, defects and sclerosis of the endplates, and osteophytes at the vertebral apophyges. The advantage of injecting steroid in to the epidural space is to reduce the inflammatory response associated with disc herniation thereby reducing pain. Reports of the effectiveness of caudal epidural corticosteroids have shown different variations that from 18% to 90%. The Intervertebral disc is avascular in nature and consists of an inner nucleus pulposus, an outer annulus fibro sus and cartilage located superiorly and inferiorly. In addition to the facet joints, the Intervertebral disc acts as load bearing component because it has the ability to resist anterior and lateral shears along with compression and flexion [2].
The most common symptom of a Lumbar PIVD is low back pain with pain radiating to lower limbs [unilateral or bilateral] with or without numbness due to the presence of neural tissue around the intervertebral disc.
Caudal epidural steroid injections are one among the most common procedures used conservatively for Lumbar PIVD and other approaches are Inter-laminar epidural steroid injection and Trans Foraminal nerve root block. The numerous publications show in favour of

caudal epidural steroid injection.

The advantage of injecting steroid in to the epidural space is to reduce the inflammatory response associated with disc herniation thereby reducing pain. Reports of the effectiveness of caudal epidural corticosteroids have shown different variations that from 18% to 90% [3].

The aim of this study is to demonstrate the effectiveness of caudal epidural steroid injection in patients with low back ache with radiating pain due to a Lumbar PIVD.

Materials and methods

This is a prospective study conducted in Department of Orthopaedics, MVJ Medical College and Research hospital, Hosakote, Bangalore. The aim of assessing the efficacy of caudal epidural steroid injection in cases of chronic low back pain due to a Lumbar PIVD with or without radicular pain not responding to conservative management. During Study period (July 2018 to July 2019) 84 such patients were encountered; 60 patients gave consent for the procedure and were enrolled for the study.

Inclusion Criteria

Patient more than 30 years and less than 60 years with history of chronic low back ache with more than 3 months with or without radicular pain in lower limbs with MRI findings of a prolapsed intervertebral discs not responding to conservative management.

Exclusion criteria

Patient not willing to participate in the study, previous history of spine surgery, having spinal structural abnormalities, uncontrolled medical illness or psychiatric disorders, fever, thoracic pain, saddle anaesthesia and neurological deficit, MRI grade D stenosis were excluded from the study.

All the patients were explained about the procedure. Informed written consent was taken from all patients. Examination of spine and neurological examination was done at admission and subsequent follow-ups. X-ray of lumbosacral (LS) spine and magnetic resonance imaging (MRI) of LS spine, complete hemogram and biochemistry was performed.

Intervention: The patient was made to lie in prone position, painted and draped around sacral region and both hip regions. The location of Sacral hiatus should be approximated by palpating the sacral cornua as 2 bony prominences, the sacral hiatus could be identified as dimple in between and confirmed in the C-arm before passing a spinal needle, local anaesthetic lignocaine is taken 5cc syringe infiltrated locally around sacral hiatus and A22 gauge spinal needle was placed through the sacral hiatus and needle placement was confirmed by the C-arm. The epidural space was injected with 80mg (2ml) Methyl Prednisolone, 1.5 ml of bupivacaine 0.5%, 6.5 ml of Distilled water in a 10 ml syringe. Following the injection, the patient turned in to supine position, both hip and knee flexed manually to maximum flexion and extend to normal for 5 times and shifted patient to ward, remained on bed rest for a day in the hospital with regular monitoring of pulse and blood pressure.

A Baseline pre-infiltration evaluation was done and documented and they were subsequently evaluated at three weeks, three months and six months follow up using Subjective parameters of pain using Numeric Pain Rating Scale (NPRS) and Disability using Oswestry Disability Index (ODI).

Numeric Pain Rating Scale: It is ten-point numerical pain rating scale in which patients rate their pain ranging from zero (no pain) to ten (worst imaginable pain). The intensity of pain can be classified as Mild [1, 2, 3], Moderate [4, 5, 6] and Severe [7, 8, 9] based on NRS score.

Oswestry Disability Index: The Oswestry Disability Index is to quantify disability in low back ache. It has ten sections namely pain intensity, personal care, lifting, walking, sitting, standing, sleep, social life, travelling and employment. Each topic category is followed by six statements describing different potential scenarios in patients life relating to Low back ache and each question is scored on a scale 0-5 with first statement being 0 and indicating least amount of disability and last statement is scored 5 indicating severe disability. The scores of all disabilities of questions and answered are added and then multiplied by 2 to obtain an index [Range 0-100] 0 is equated with No disability and 100 is the maximum disability possible. The Total score is expressed in percentage [18] 2. The scoring 0-20% Minimal disability, 21-40% Moderate disability, 41%-60% Severe disability, 61%-80% Crippling back pain, 81%-100% These patients are either bed-ridden or have an exaggeration of their symptoms.

Results: Total 60 patients are selected for study and 2 patients lost for follow up 58 patients completed required follow up to the period of 6 months. The age distribution of 58 patients (48 male and 10 females) ranged from 30 to 60 years; average being 46.06 years, in between 30 to 40 years male 8 and female 2 patients, in between 40 to 50 years male 10 and female 6 patients, in between 50 to 60 years male 24 and female 2 patients [Table 1].

Table 1: Age distribution of patients

	30-40 years	40-50 years	50-60 years
Male	8	16	24
Female	2	6	2

The Duration of back ache ranged from 3 months to more than 12 months average being 8.1months. The duration in between 3-9 months Male 10, Female 2 patients, in the duration of 9-12 months Male 20 and Female 2 patients, in the duration more than 12 months Male 26 and Female 6 patients.

Table 2: Duration of symptoms

Duration	Male	Female
3-9 Months	10	2
9-12 Months	12	2
>12 Months	26	6

The lumbar intervertebral disc distribution in the patients are at the level L1-L2 male 0 and female 0, L2-L3 male 10 and female 3 patients, L3- L4 male 18 and female 3 patients, L4-L5 male 20 and female 4 patients.

Table 3: Level of disc in lumbar spine

Level of disc	Male	Female
L1-L2	0	0
L2-L3	2	0
L3-L4	6	3
L4-L5	19	3
L5-S1	21	4

The radicular pain distributed as patients with radicular pain male 30 and female 7patients and without radicular pain male 18 and female 3 patients.

Table 4: Radicular pain distribution

Gender	Present	Absent
Male	30	18
Female	7	3

Assessment using the Numeric Pain Rating Scale
Pre infiltration

Grade	Mild [1-2-3]	Moderate [4-5-6]	Severe [7-8-9]
No. of patients	9	34	15

Post infiltration back pain relived at the follow up

Follow up at	No of patients with significant relief [Mild pain]	% of patients who improved
3 weeks	30	52%
3 months	40	69%
6 months	45	78%

According to the ODI functional outcome assessment
Base line assessment prior to steroid infiltration

Pre injection	Minimal	Moderate	Severe	Crippling
Baseline	9	34	9	6

Post infiltration of steroid

Assessment at	Minimal	Moderate	Severe	Crippling
3 weeks	30	15	7	6*
3months	40	10	2	6*
6 months	45	5	2**	

* underwent surgery at 3 months as there was no relief of symptoms; ** underwent surgery at 6 months as there was no improvement of symptoms

In our study group of 58 patients 30 patients showed significant improvement in their ODI assessment at 3 weeks, the number increased to 40 and 45 at 3 and 6 months respectively. Patients who had severe or crippling scores per infiltration showed poor or no improvement in their scores post infiltration. 6 patients in the crippling category underwent surgery at 3 months, 2 patients had no significant improvement on serial follow ups and underwent surgery at 6 month. We also noticed that patients with lower lumbar disc lesions [L4-L5; L5-S1] had significantly better improvement of their pain scores and ODI scores.

Discussion

Low backache due to a prolapsed lumbar intervertebral disc is an important medical and socio- economic problem in India. Pain leads to reduced mobility and functionality causing compromise in the quality of life in working individuals. Disc degeneration and herniation causes compression and mechanical irritation due to pro inflammatory mediator release that may lead to low back ache.

The results of caudal epidural steroid injections were first reported by Goebert *et al.* who conducted their study on 239 patients with sciatica and administered three injections of procaine and hydrocortisone into the epidural space and reported greater than 60% relief of symptoms in 58% of the patients.

Murakibhavi and Khemka *et al.* reported that in sample size of 50 patients all patients responded well for the caudal epidural steroid injection and Oswestry Disability Index score shows the improvement in both short term and long term results [4].

Ahamed *et al.* reported caudal epidural steroid injection is effective in chronic low back pain [5].

Cohen *et al.* reported caudal steroid injection is best treatment for low backache with radicular symptoms due disk herniation and previous surgery and further added risk of Dural puncture is very low [6].

North American spine society stated that steroid injections given in to the epidural space is safe and easy procedure and effective in reducing pain and further clarifies non image guiding injections are non-specific compared to image guiding techniques [7] so we performed the procedure under c arm. Manchikanti *et al.* has conducted study on effectiveness of caudal epidural, interlaminar Inter-Foraminal steroid injections and reported that caudal epidural is superior to interlaminar and equal to inter-for animal steroid injections [8]

Parr *et al.* reported that in chronic low back ache and radicular pain due to herniated disc was treated with local anaesthetic and steroids shows good relief in chronic back pain, spinal stenosis, post-surgery syndrome. Our study recommended for caudal epidural steroid injection in chronic low back ache with radicular pain [9].

In our study due to efficacy and cost effectiveness we selected caudal epidural steroid injection which was administered under c-arm guidance and is safe and effective. We performed the procedure using c arm with 80% methyl prednisolone, 0.5% bupivacaine 1.5 ml and distilled water 6.5 ml in 10 ml syringe and 22 gauge spinal needle is used, the local anaesthetic relives pain immediately and steroids with its anti-inflammatory properties achieves long term pain relief [10].

We observed our 58 patients using numeric pain rating scale pre infiltration and post infiltration of steroid, pre infiltration 9 patients shows mild pain, 34 moderate pain and 15 patients are severe after post infiltration pain is relived from moderate and severe to mild pain and follow up done in 3 weeks, 3 months, and 6 months. In 3 weeks 52% of patients shows pain relief, after 3months increased to 69%, after 6 months 78% of patients are relived from pain only 22% patients are not relived from pain.

In our study group of 58 patients 30 patients showed significant improvement in their ODI functional assessment at 3 weeks, the number increased to 40 and 45 at 3 and 6 months respectively. Patients who had severe or crippling scores per infiltration showed poor or no improvement in their scores post infiltration. 6patients in the crippling category underwent surgery at 3months, 2patients had no significant improvement on serial follow ups and underwent surgery at 6 months.

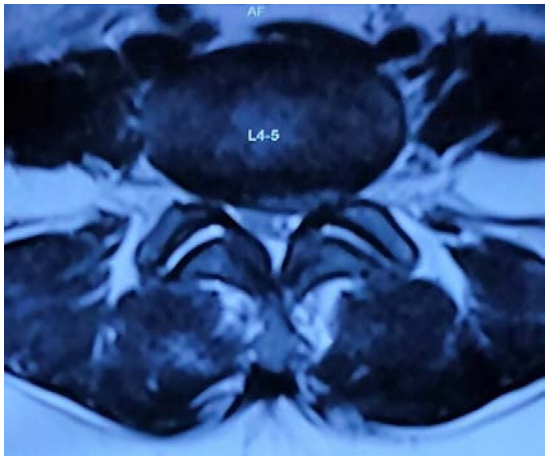

Fig 1: MRI Showing L4-L5 PIVD [Axial View]

Fig 2: MRI Showing L4-L5 PIVD

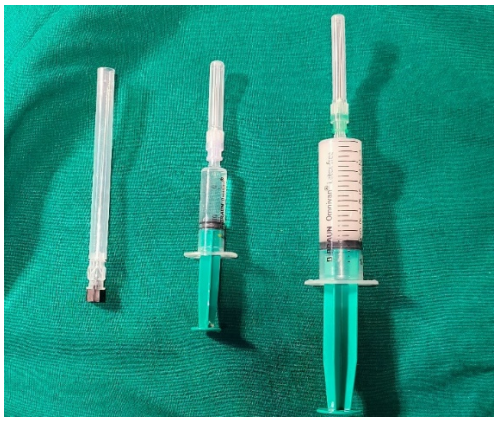

Fig 3: Requirements for Caudal Epidural Steroid Injection Spinal Needle No. 22, 5 CC Syringe, 10 CC Syringe

Fig 4: Injecting Steroid Injection Through the sacral Hiatus

Fig 5: C-ARM Position of spinal needle in AP View

Fig 6: C-ARM Position of spinal needle in Lateral View

Conclusion

Caudal epidural steroid injections are a simple and cost-effective modality of treating chronic low back ache with radicular pain due to Lumbar PIVD. They have consistently shown significant pain relief, and improvement in functional outcome.

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